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July 13, 1998

VIA FACSIMILE
Confirmation by First Class Mail
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THE INTERNATIONAL BUREAU OF WIPO
34, Chemin des Colombettes
1211 Geneva 20
Switzerland

Re: International Application No. PCT/US96/11300
Applicant: Cera, Inc.
Filing Date: July 3, 1993
Title: MICROCOLUMN FOR EXTRACTION OF ANALYTES FROM LIQUIDS
Article 19 Preliminary Amendment
Sheldon & Mak Docket No. 10455-1PCT

Dear Sir:

Pursuant to PCT Article 19 and Rule 46, Applicant amends its claims as follows:

Enclosed are substitute pages 15, 16, 17, and 18, and new page 19. Originally there were 26 claims numbered 1 to 26. After this amendment, there are 28 claims numbered 1-28. All of the claims correspond to the original claims except that claim 17 has been broadened, claim 20 has been narrowed, and claims 27 and 27 are new claims.

Respectfully submitted,

SHELDON & MAK

By: _____
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JGS/mcp
Enclosures

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July 13, 1998

d) an upper mesh flow distributor above the upper compression layer and a lower mesh flow distributor below the lower compression layer sandwiching the compression layers and the layer of extraction media therebetween, the flow distributors holding the extraction media and the compression layers in the microcolumn, the upper compression layer distributing liquid sample uniformly across the top surface of the extraction media layer.

17. Apparatus for extracting an analyte from a liquid sample comprising:

a) a container having an entrance, an exit, and a passage therebetween for passage of a liquid sample containing an analyte therethrough, the container having a substantially flat bottom wall with the exit substantially centrally located therein;

b) within the passage, a thin layer of microparticulate extraction media for extracting the analyte from the liquid sample, wherein:

(i) the extraction media layer has a top surface, a bottom surface, and a peripheral edge,

(ii) the extraction media has a particle size of less than 20 microns,

(iii) the distance between the top and bottom surfaces of the extraction media layer is less than 1 mm, and

(iv) the extraction media layer is oriented in the passage so that liquid flows through the layer from its top surface to the bottom surface; and

c) an upper compression layer at the top surface of the extraction media layer and a lower compression layer at the lower surface of the extraction media layer, the two compression layers pressing the extraction media therebetween, the compression layers being sufficiently porous that the liquid sample can flow therethrough, the compression layers being formed of a

flexible, hydrophilic, microfiber material and having a pore size less than the particle size of the extraction media.

18. The apparatus of claim 17 including an upper mesh flow distributor above the upper compression layer for distributing flow of the liquid sample through the extraction media.

19. The apparatus of claim 18 wherein the upper mesh flow distributor holds the compression layers and the extraction media layer in the microcolumn.

20. The apparatus of claim 18 including a lower mesh flow distributor below the lower compression layer.

21. A method of extracting a substance from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 1 for transverse flow through the extraction media layer and out the exit, wherein the substance is extracted from the liquid sample by the extraction media.

22. A method of extracting an analyte from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 12 for transverse flow through the extraction media layer and out the exit, wherein the analyte is extracted from the liquid sample by the extraction media.

23. A method of extracting an analyte from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 16 for transverse flow through the extraction media layer and out the exit, wherein the analyte is extracted from the liquid sample by the extraction media.

24. A method of extracting an analyte from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 17 for transverse flow through the extraction media layer and out the exit, wherein the analyte is extracted from the liquid sample by the extraction media.

25. The apparatus of claim 1 wherein the ratio of the effective diameter of the extraction media layer to the distance between its top and bottom surfaces is at least 10.

26. Apparatus for extracting a substance from a liquid sample comprising:

(a) a container having a top, a bottom, an entrance in the top, an exit in the bottom, and a passage between the entrance and exit for downward passage of a liquid sample therethrough, the bottom having an inner wall which is substantially flat with the exit being substantially centrally located in the bottom;

(b) within the passage, a thin layer of microparticulate extraction media for extraction of the substance from the liquid sample; and

(c) cylindrical support means for the extraction media layer, the support means having a flat upper surface and a flat lower surface, the support means being directly seated against the bottom inner wall and the extraction media layer being directly against the support means.

27. The apparatus of claim 26 wherein the support means comprises a lower compression layer at the lower surface of the extraction media layer and a lower mesh flow distributor below the lower compression layer.

28. The apparatus of claim 27 comprising an upper compression layer at the upper surface of the extraction media layer and an upper mesh flow distributor above the upper compression layer.

ABSTRACT

An apparatus (**10**) for extracting an analyte from a liquid sample, comprises a microcolumn (**12**) having a microparticulate media therein, the media being sandwiched between two compression layers (**18a**, **18b**). Preferably, the compression layers comprise a binder-free glass fiber, held in the microcolumn by upper and lower polypropylene mesh (**16a**, **16b**). Preferably the microcolumn has a flat bottom (**50**) with a centrally located exit (**51**).